WHAT IS CLAIMED IS:

1. A waveguide configuration comprising:

a core having an index of refraction and a shear velocity, the core being doped with Al, Yb, wherein the respective amount Yb in the divalent state is such that any indirect and direct losses of Yb in the divalent state are exceeded by the gain attributable to Yb in the trivalent state;

a first cladding extending about the core having a shear velocity which is less than that of the core and an index of refraction which is less than the core;

a second cladding extending about the first cladding, the second cladding having a shear velocity which is greater than that of the first cladding, wherein an optical mode has an index of refraction greater than that of the second cladding;

third cladding extending about the second cladding, the third cladding having an index of refraction less than that of each of the core, first cladding and second cladding; and

a buffer extending about the third cladding.

2. The waveguide configuration of claim 1 wherein the core includes at least one mitigating agent in place of at least some Al.

3. The waveguide configuration of claim 2 wherein the mitigating agent comprises at least one of the group selected consisting of: Boron, Fluorine, Phosphorous, and Germanium.

4. The waveguide configuration of claim 1 wherein the indirect and direct losses of Yb in the divalent state are exceeded by the gain attributable to Yb in the trivalent state by a factor of at least two.

5. The waveguide configuration of claim 4 wherein the factor of at least two comprises a factor of at least six.

6. The waveguide configuration of claim 1 wherein the core is substantially free of divalent Yb.

7. A waveguide configuration comprising:

- a core including Al and Yb, the respective amount Yb in the divalent state is such that any indirect and direct losses of Yb in the divalent state are exceeded by the gain attributable to Yb in the trivalent state;

- at least one cladding extending about the core; and

- a buffer extending about the outermost of the at least one cladding.

8. The waveguide configuration of claim 7 wherein the core includes at least one mitigating agent in place of at least some Al.

9. The waveguide configuration of claim 7 wherein the mitigating agent comprises at least

one of the group consisting of: Boron, Fluorine, Phosphorous and Germanium.

10. The waveguide configuration of claim 7 wherein the at least one cladding comprises a first cladding and a second cladding.

11. The waveguide configuration of claim 7 wherein the Yb within the core is substantially entirely trivalent Yb.

12. A method for minimizing the formation of divalent Yb within a waveguide comprising the steps of:

- providing a waveguide;
- doping the core with Al;
- doping the core with Yb; and
- minimizing the formation of divalent Yb.

13. The method of claim 12 wherein the step of minimizing the formation of divalent Yb comprises the step of: doping the core with a mitigating agent.

14. The method of claim 13 wherein the mitigating element comprises at least one of the group consisting of: Boron, Fluorine, Phosphorous and Germanium.

15. The method of claim 12 wherein the step of controlling the formation of divalent Yb comprises the step of preclusion of the formation of YbAl clusters within the core.

16. The method of claim 15 wherein the step of preclusion of formation of YbAl clusters within the core comprises the maintaining of Yb and Al below the relative concentration levels wherein Al-Yb precipitates during cooling.

17. The method of claim 12 wherein the step of minimizing comprises the step of minimizing the formation of divalent Yb such that the respective amount Yb in the divalent state is such that any indirect and direct losses of Yb in the divalent state are exceeded by the gain attributable to Yb in the trivalent state.